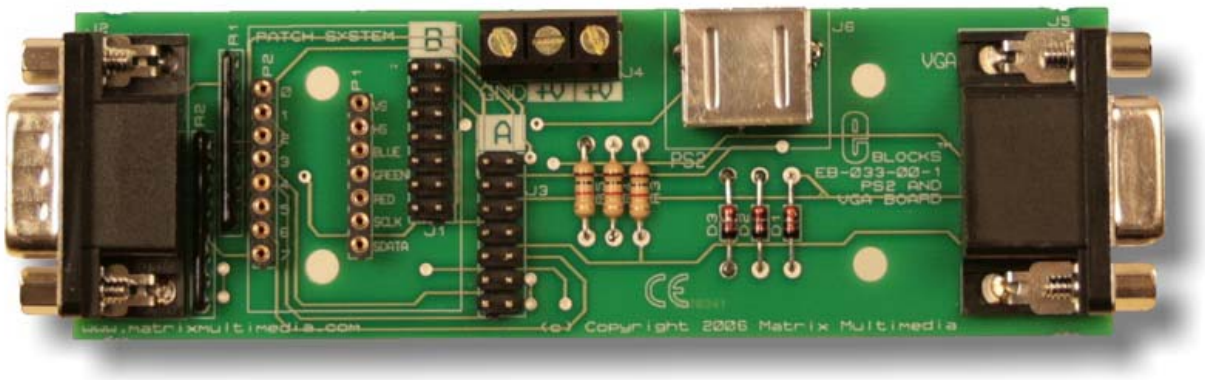
PS/2 and SVGA Board
EB033-00-2



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Appendix 1 Circuit diagram

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1. About this document

This document concerns the PS/2 and SVGA E-Block, EB033 version 2.

The order code for this product is EB033.

1. Trademarks and copyright

PIC and PICmicro are registered trademarks of Arizona Microchip Inc.
E-blocks is a trademark of Matrix Multimedia Limited.

2. Other sources of information

There are various other documents and sources that you may find useful:

Getting started with E-Blocks.pdf

This describes the E-blocks system and how it can be used to develop complete systems for learning electronics and for PICmicro programming.

PPP Help file

This describes the PPP software and its functionality. PPP software is used for transferring hex code to a PICmicro microcontroller.

C and assembly strategies

This is available as a free download from our web site.

3. Disclaimer

The information in this document is correct at the time of going to press. Matrix Multimedia reserves the right to change specifications from time to time. This product is for development purposes only and should not be used for any life-critical application.

4. Technical support

If you have any problems operating this product then please refer to the troubleshooting section of this document first. You will find the latest software updates, FAQs and other information on our web site: www.matrixmultimedia.com . If you still have problems please email us at: support@matrixmultimedia.co.uk.

2. General information

1. Description

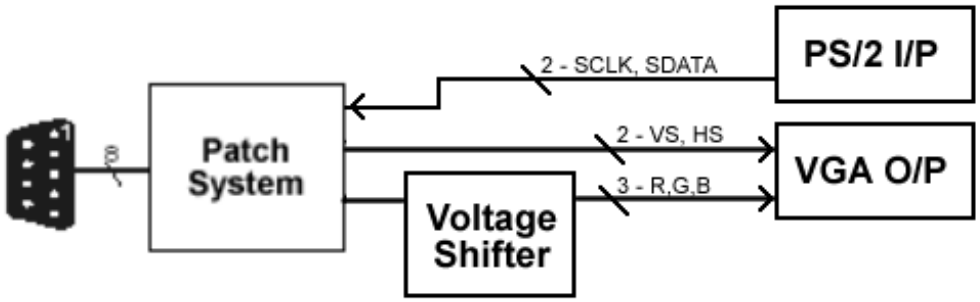
This E-block allows investigation of PS/2 devices such as keyboards and mice, as well as VGA, SVGA etc outputs for computer monitors. The main function of this E-block is to add the capabilities of inputting and outputting PC based information.

A set of jumper links are available which allow the PS/2 SVGA E-block to easily be set for all PICmicro® microcontroller devices. With the patch system available on board makes this board compatible with numerous other controller devices.

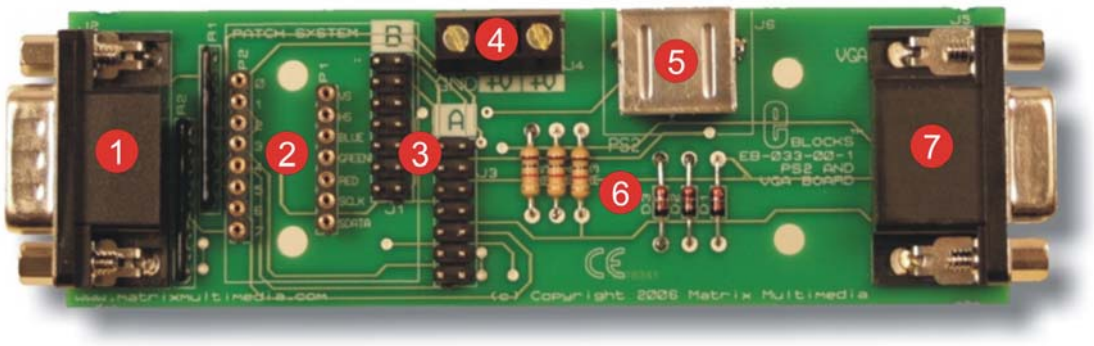
2. Features

- PS/2 serial data and serial clock
- VGA horizontal and vertical sync controls
- VGA red, green and blue controls
- Voltage shifter for RGB signals

3. Block schematic



3. Board layout



EB033-74-1.jpg

1) 9-way downstream D-type connector
2) Patch system
3) Mode selection jumper pins
4) Power screw terminals
5) PS/2 port
6) Voltage shifter 5v to 0.7v
7) SVGA port

General Guide for mode and patch system:

Jumper at A		Jumper at B
Signal	Pin	
SDATA	0	Patch System
SCLK	1	
BLUE	2	
GREEN	3	
RED	4	
VS	5	
HS	6	

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4. Testing this product

The following programs will test the circuit. The test file can be downloaded from www.matrixmultimedia.com.

1. SVGA Test

Required:
1 x Computer monitor
1 x 10Mhz Crystal
1 x PICmicro with PLL capability
1 x Multi-programmer Board / Dev Board
1 x PS/2 SVGA E-Block connected to port B

Download the test file SVGA.HEX to your PICmicro

2. Keyboard PS/2 Test

Required:
1 x PS/2 computer keyboard
1 x Multi-programmer Board / Dev Board
1 x PS/2 SVGA E-Block connected to port B

Download the test file Keyboard.HEX to your PICmicro

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5. Circuit description

The circuit as can be seen in the circuit diagram below (See Appendix 1 – Circuit diagram), made up of four sections: Connectors, voltage shifter, PS/2 port and SVGA port.

1. Connectors

The design of this product is to enable you to use it with many standard PICmicro® microcontroller devices. Other microcontroller devices can also be used to integrate with the PS/2 and SVGA connections. The patch system allows any combination of connections to be made allowing for a fully flexible compatibility with any microcontroller or embedded system.

Jumper setting A and B are used for selecting the appropriate pins for SCLK and SDATA the dedicated PS/2 lines and VS, HS, R, G and B the dedicated VGA lines.

The following table illustrates the pin allocation settings.

Jumper at A		Jumper at B
Signal	Pin	
SCLK	0	Patch System
SDATA	1	
BLUE	2	
GREEN	3	
RED	4	
VS	5	
HS	6	

2. Voltage Shifter

The Voltage Shifter that is used on this board is a directional 5V to 0.7V converter. The device consists of pairs of resistors and diodes, one for each of the SVGA colour data lines. The Chip is used to convert the voltages sent from the PICmicro® or other microcontroller into a level that will not damage the SVGA monitor. The resistors are powered via +V and the diodes are connected to ground to reduce the voltage.

3. PS/2 Port

The PS/2 port allows a PS/2 device such as a keyboard or mouse to be connected to the EB033 board. The data lines that are connected to the PS/2 port are the SCLK and SDATA lines. The PS/2 protocol allows for the external device to control most of the handshaking and data transferring. When a external PS/2 device is writing data via the serial connection lines there is a clock signal and synchronized with this is a data line which has the following scheme: one start bit (logic 0), eight data bits, one parity bit (odd parity) and one stop bit (logic 1).

4. SVGA Port

The SVGA port allows a VGA / SVGA device such as a computer monitor to be connected to the EB033 board. The data lines that are connected to the VGA port are the VS, HS, Blue, Green and Red lines. The VGA protocol specifies that the controller handle all of the timing information regarding sync pulses and data output. The data is sent out in a stream in the middle of the vertical sync pulse routine. However horizontal sync pulses must always be sent even when not sending data.

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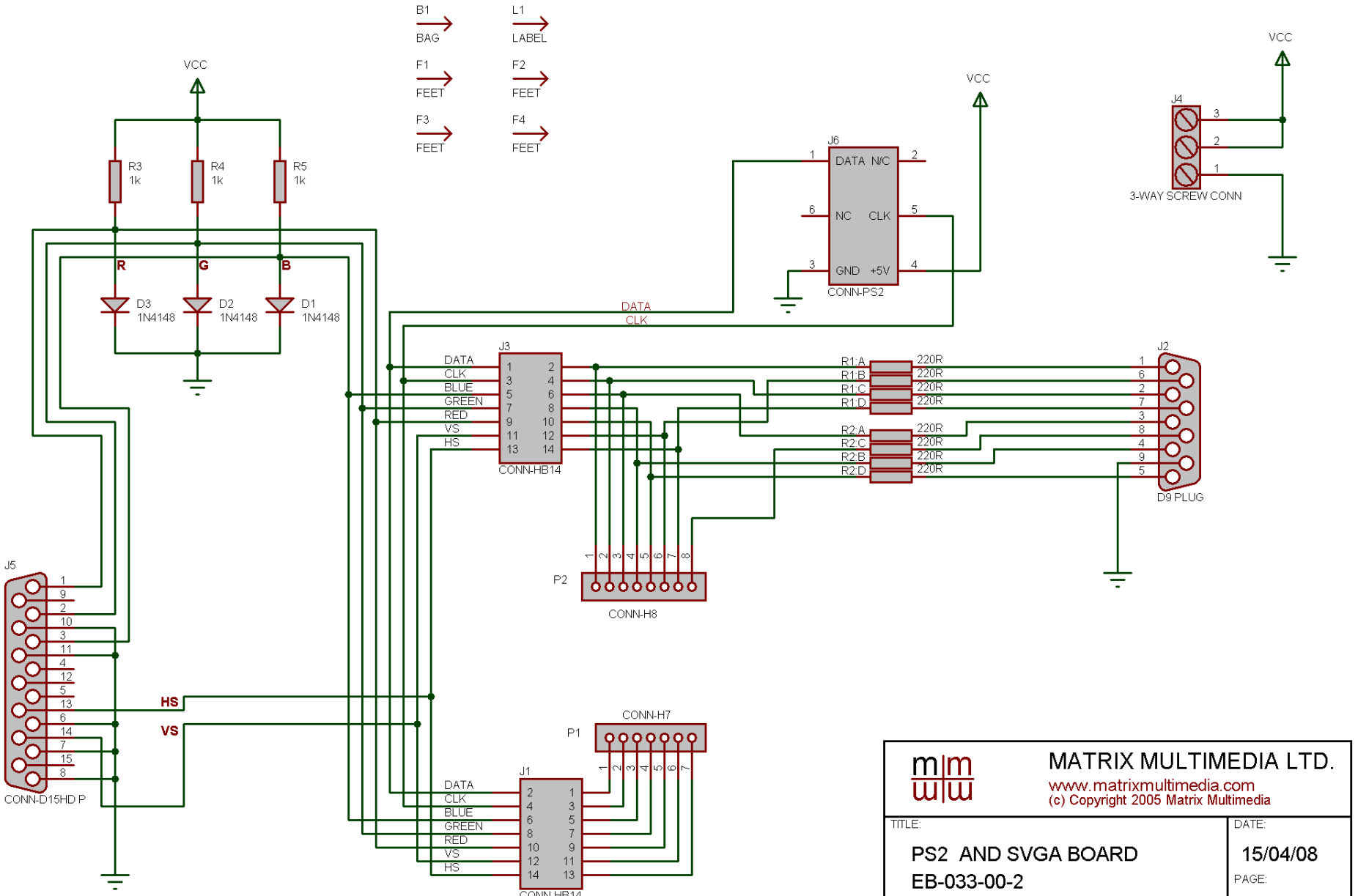
Appendix 1 – Circuit diagram



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